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Bonningue

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(54) **PUMP INTENDED TO BE FITTED TO A CONTAINER**

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(51) **Int. Cl.**[7] **B67D 5/40**
(52) **U.S. Cl.** **222/380**; 222/321.7; 222/341
(58) **Field of Search** 222/321.1, 321.7, 222/382, 380, 341

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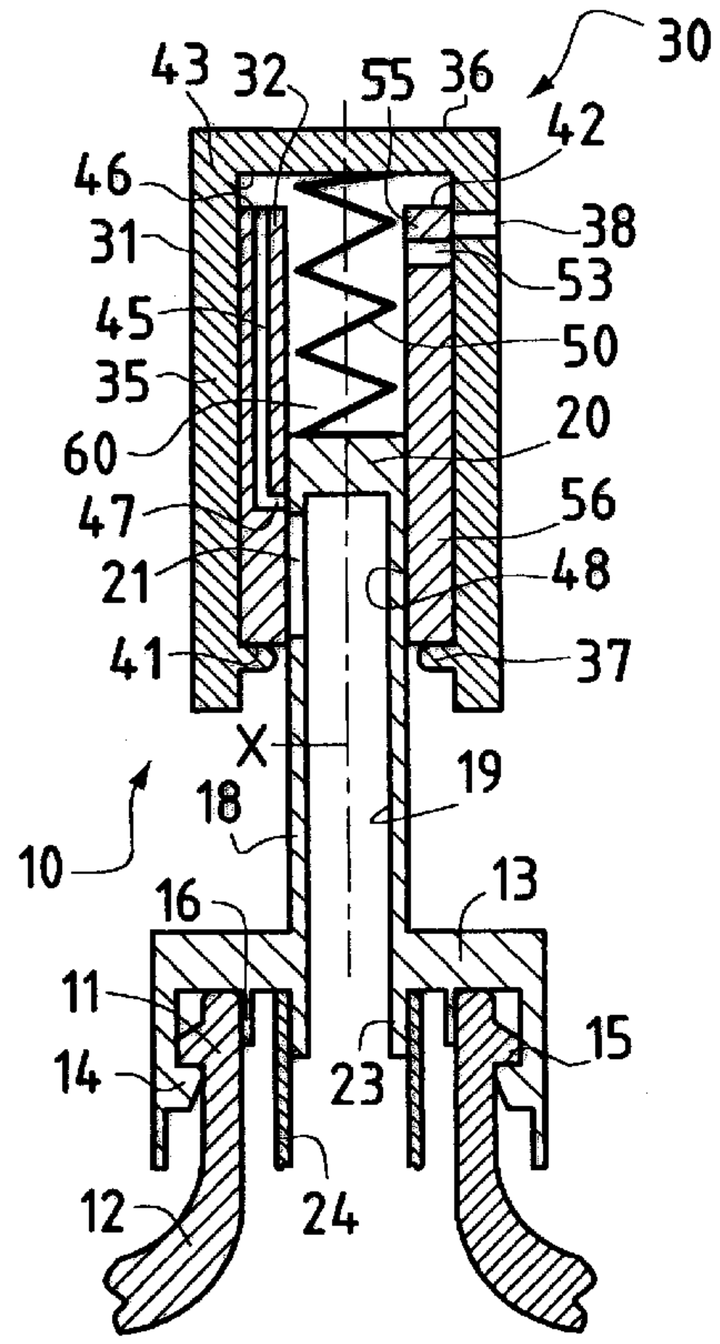
(57) **ABSTRACT**

The invention relates to a pump **(10)** comprising a base part **(13)** and a telescopic assembly **(30)** defining a pumping chamber **(60)**. The telescopic assembly comprises at least one outer sleeve **(31)** and an inner sleeve sliding inside it. The telescopic assembly **(30)** is arranged in such a way that, on the one hand, when the outer sleeve **(31)** is moved to reduce the volume of the pumping chamber, the assembly adopts a dispensing configuration and shut-off means **(32)** shut off the filling orifice **(21)** and, on the other hand, when the outer sleeve is moved to increase the volume of the pumping chamber, the telescopic assembly adopts its filling configuration and the shut-off means **(32)** cease to shut off the filling orifice **(21)**.

16 Claims, 3 Drawing Sheets



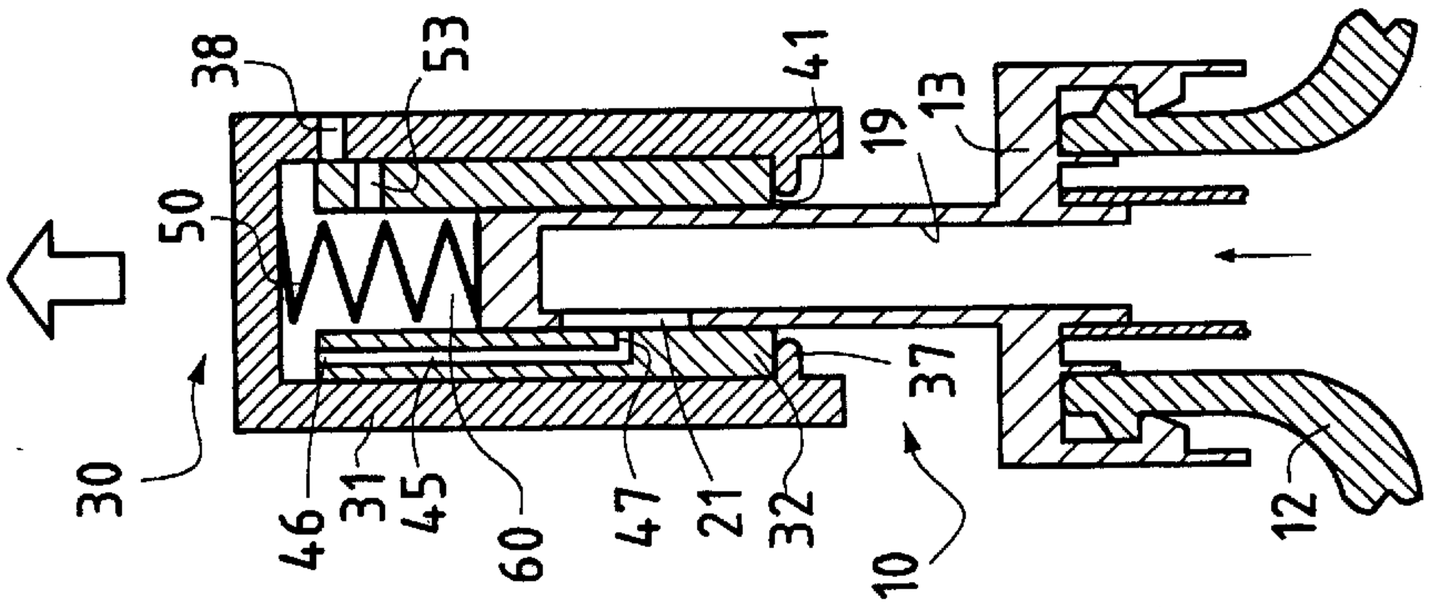


FIG.4

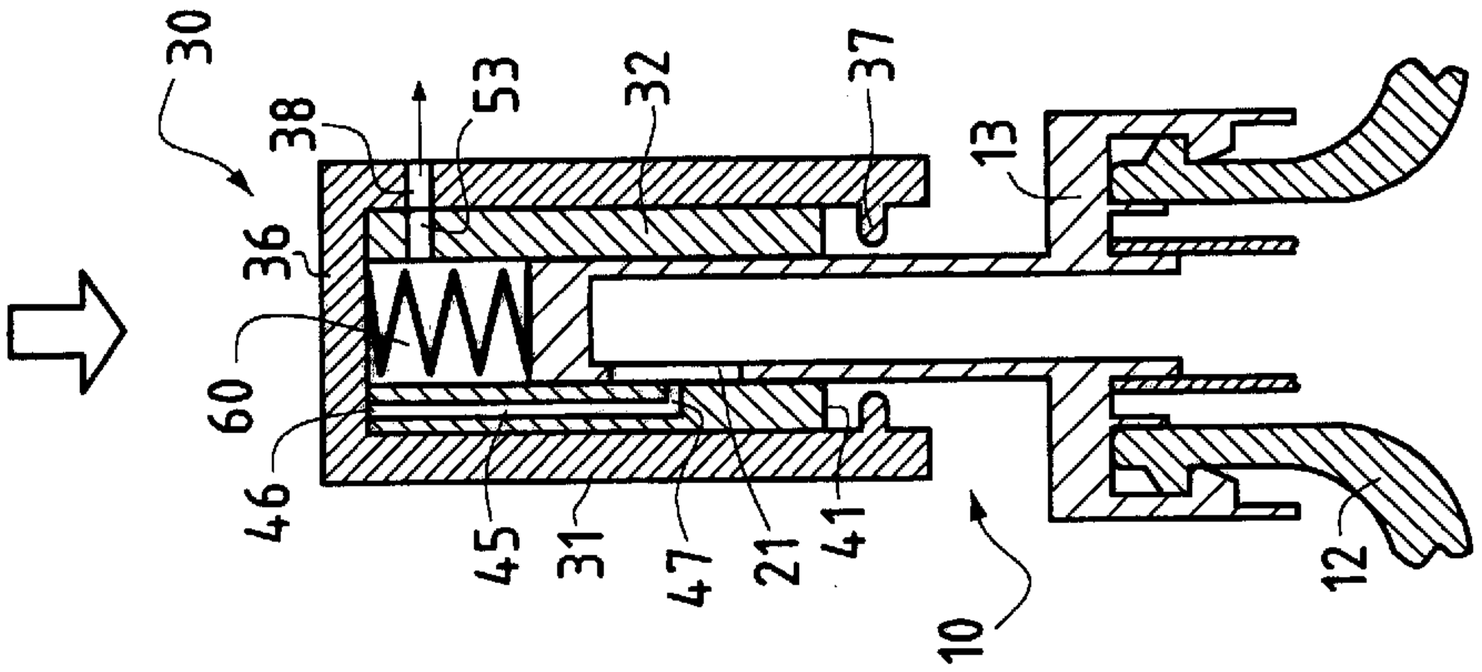


FIG.3

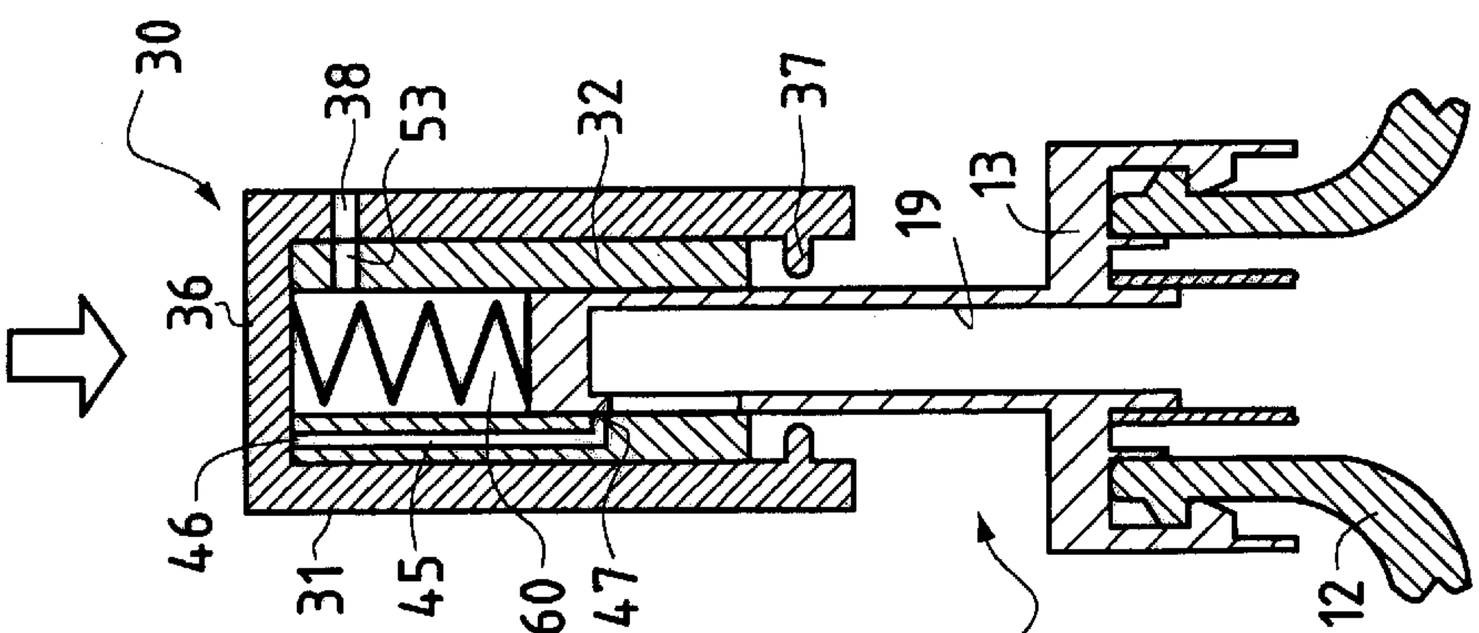


FIG.2

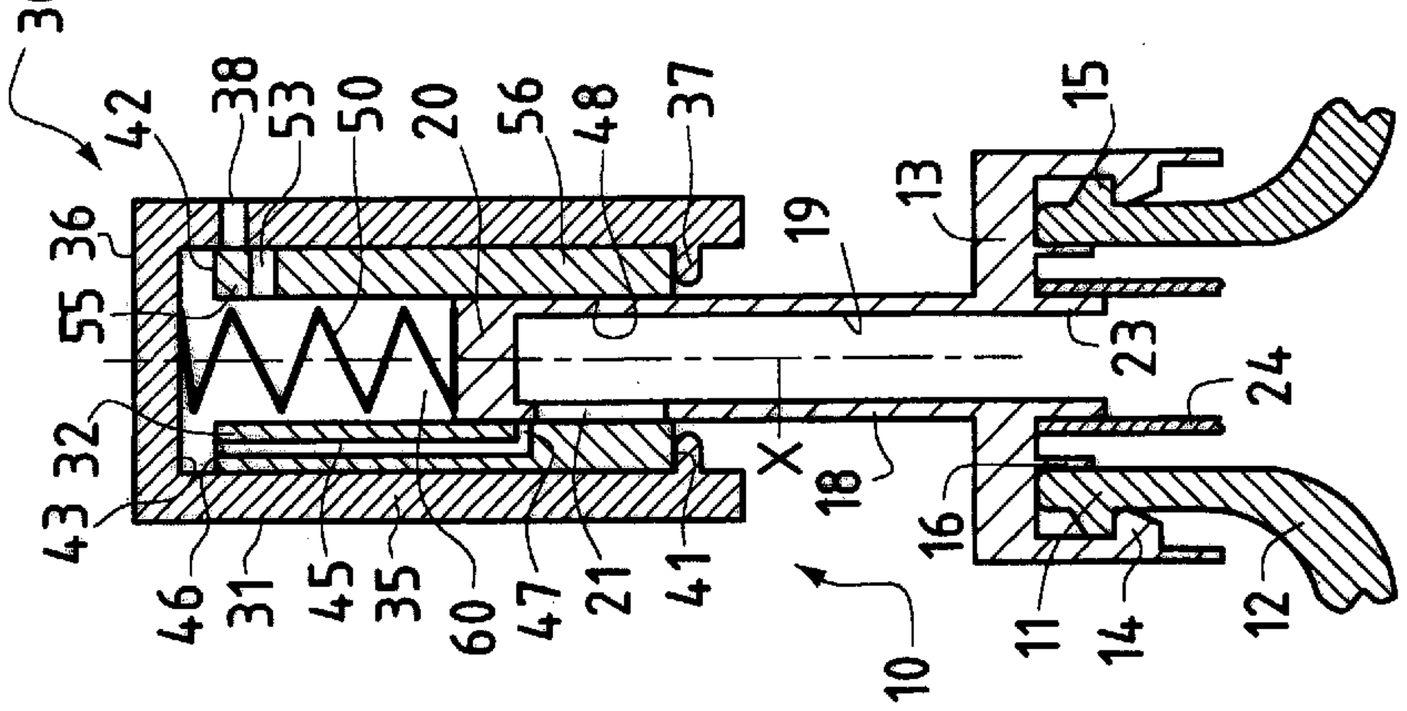


FIG.1

FIG.8

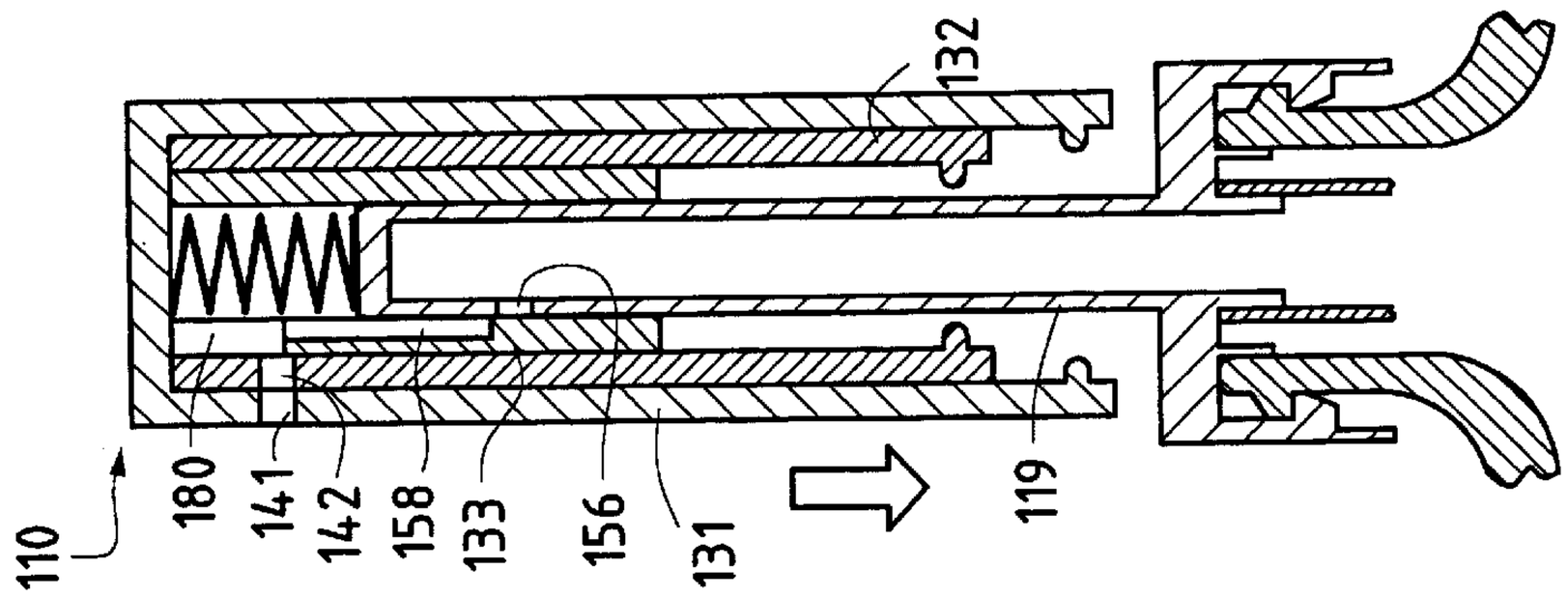


FIG.7

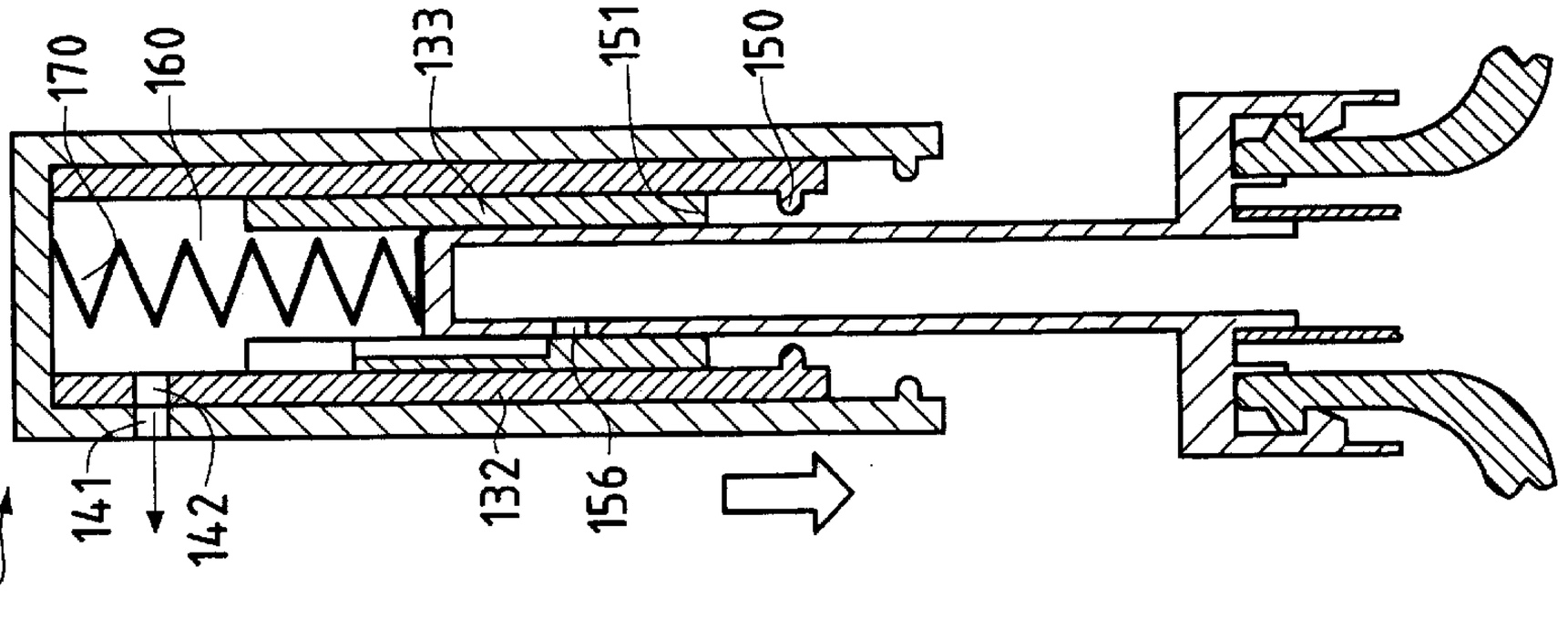


FIG.6

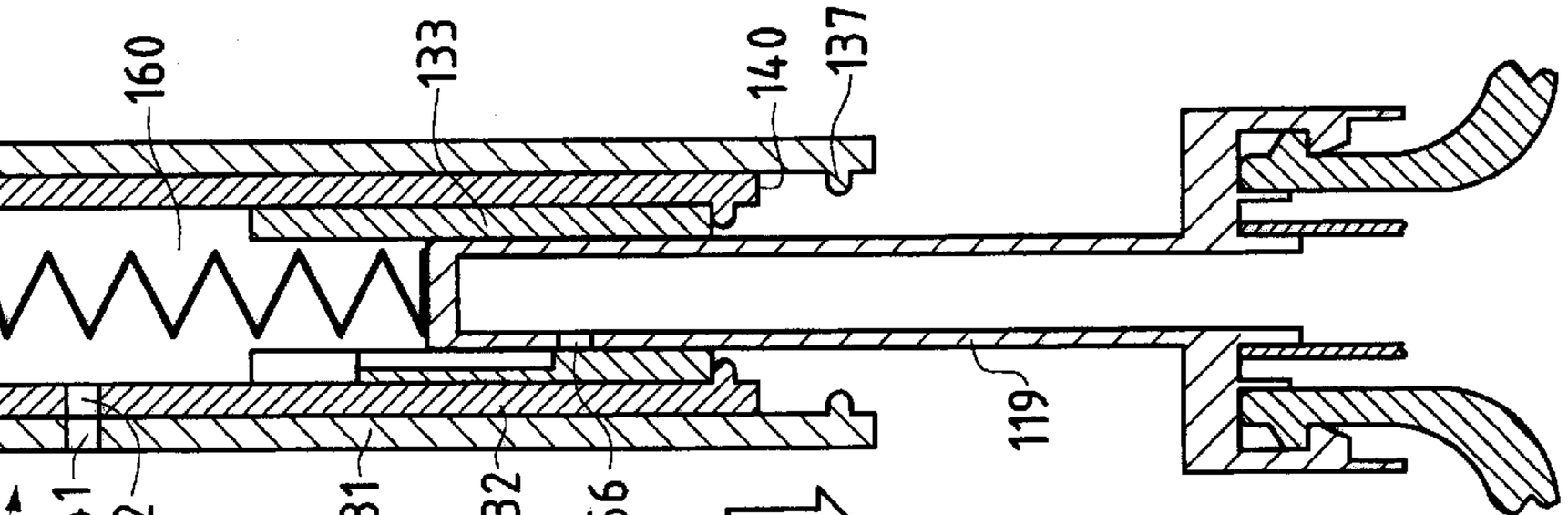
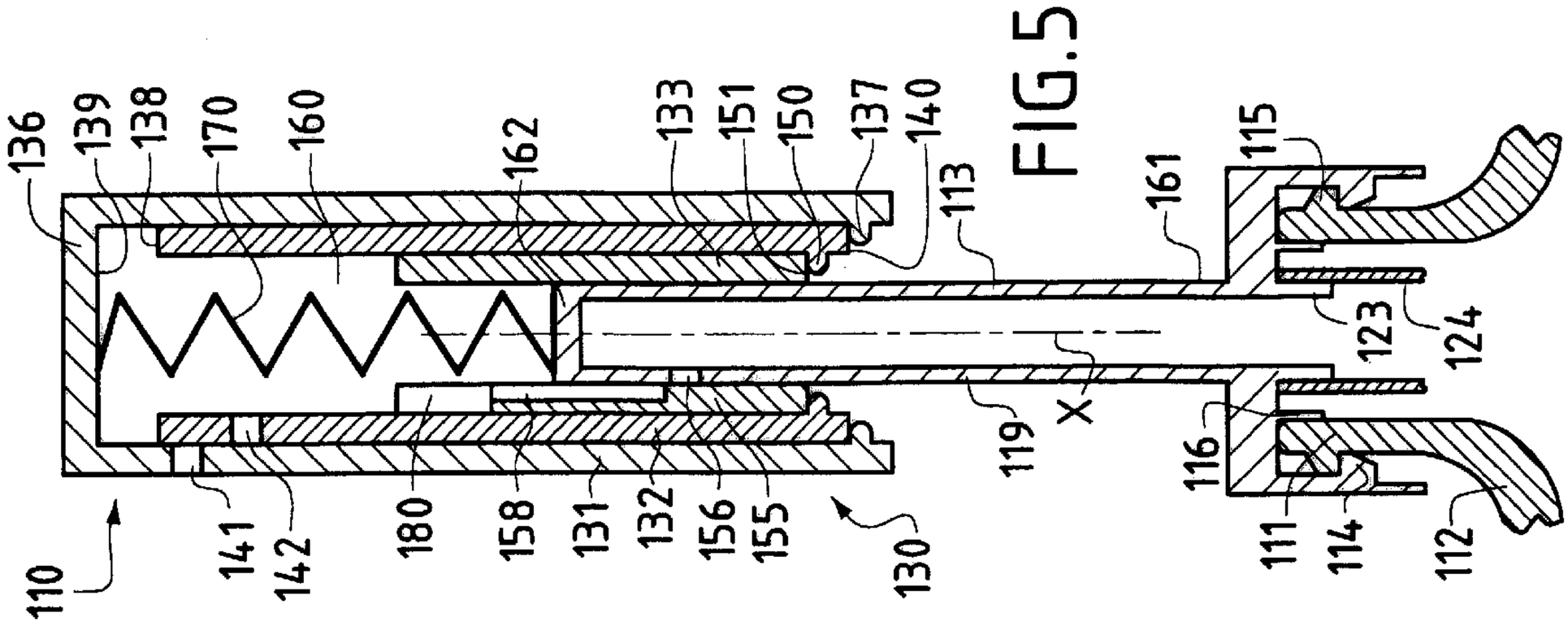


FIG.5



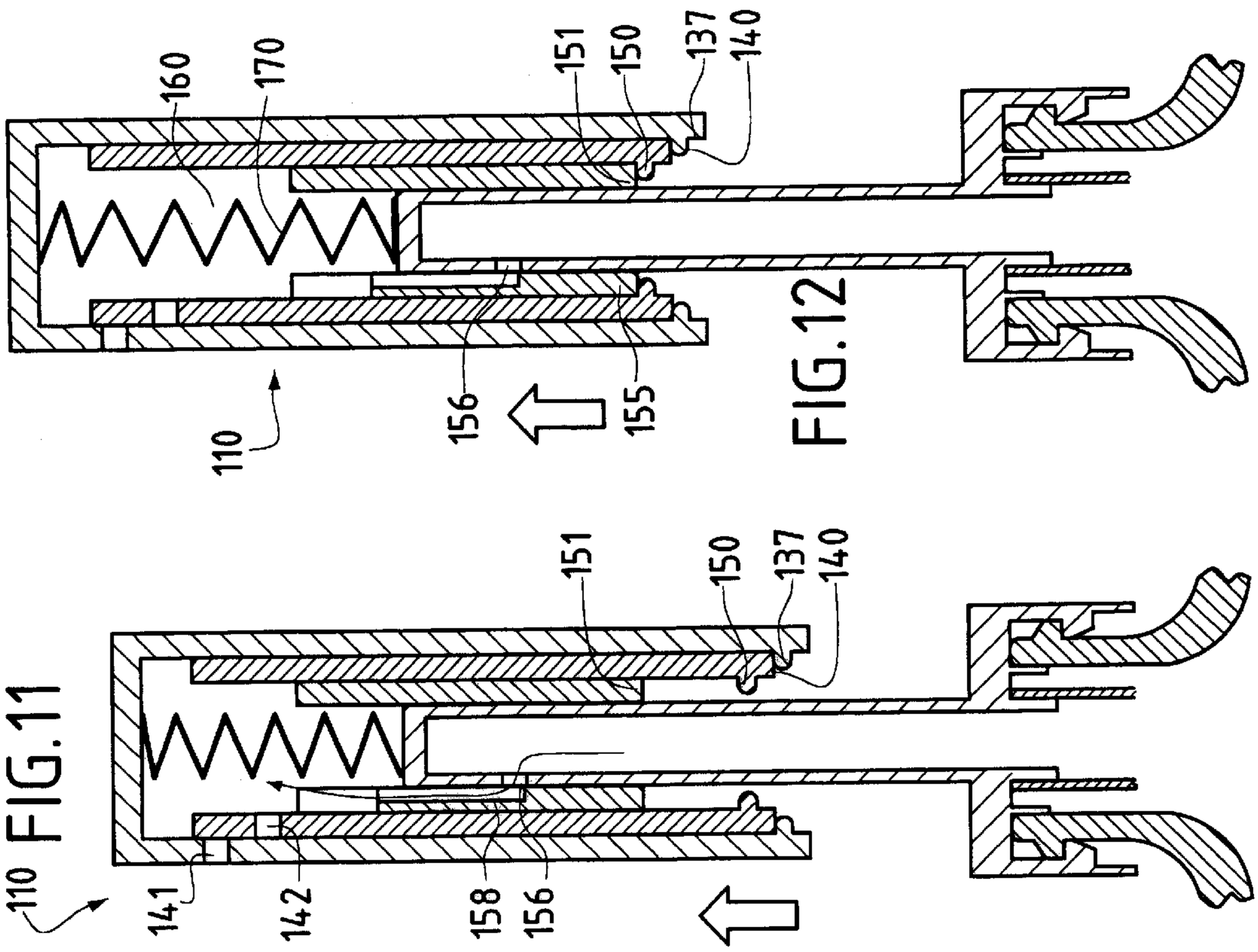


FIG.12

FIG.11

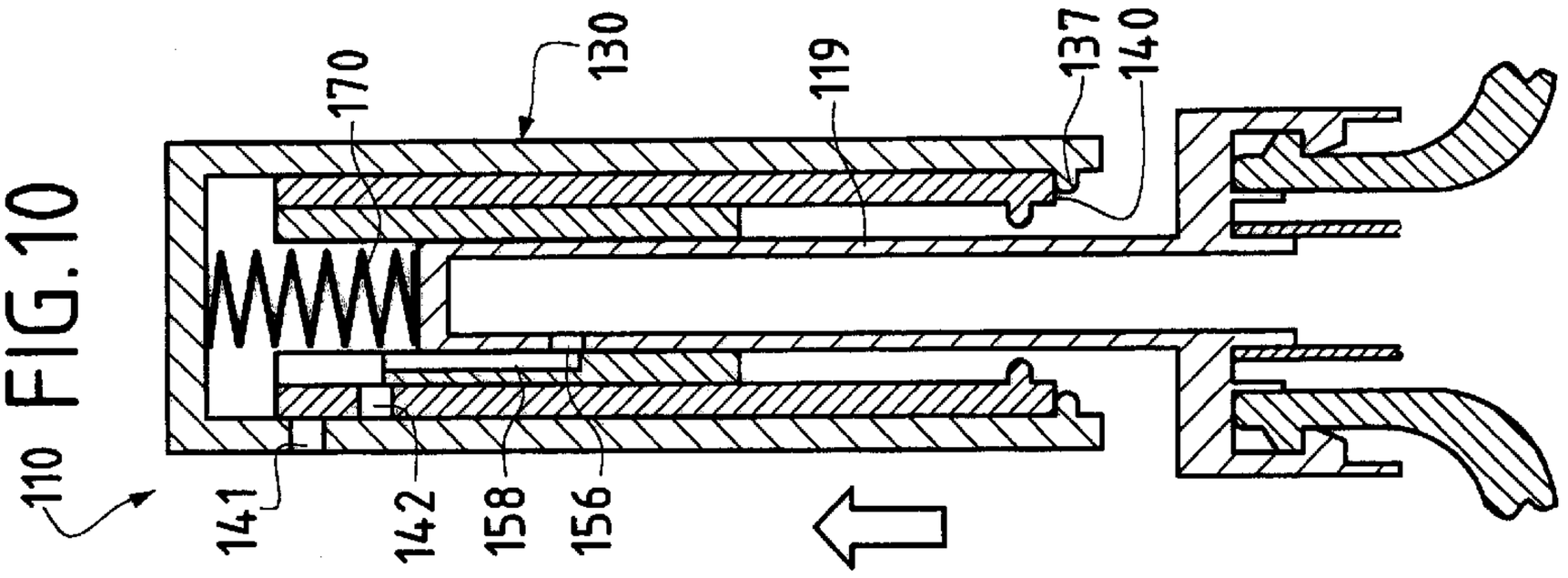


FIG.10

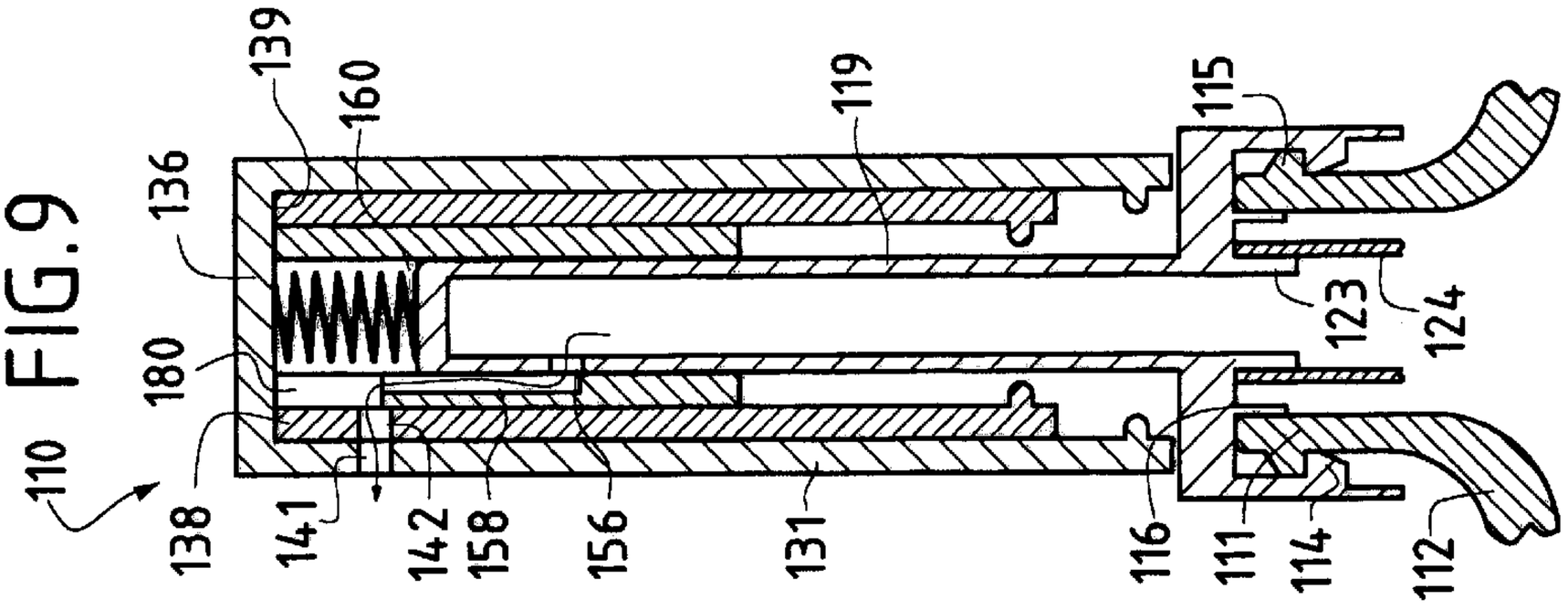


FIG.9

PUMP INTENDED TO BE FITTED TO A CONTAINER

The present invention relates to a pump intended to be fitted to a container, particularly a container containing a cosmetic product.

The invention is aimed more specifically at providing a new pump which is inexpensive to manufacture and operates reliably.

The pump according to the invention comprises a base part secured to the container and is characterised in that it comprises a telescopic assembly which can move axially with respect to this base part and which defines therewith a variable-volume pumping chamber, the telescopic assembly comprising at least one outer sleeve and an inner sleeve sliding in contact with and inside the former sleeve, these sleeves each comprising a dispensing passage, these dispensing passages communicating with each other when the telescopic assembly is in a dispensing configuration, to then define an outlet passage allowing the product contained in the pumping chamber to be dispensed, the said dispensing passages ceasing to communicate with each other when the telescopic assembly is in a filling configuration, the base part comprising a filling orifice via which the product contained in the container can be drawn up to fill the pumping chamber, the telescopic assembly being arranged in such a way that, on the one hand, when the outer sleeve is moved to reduce the volume of the pumping chamber, the telescopic assembly adopts its dispensing configuration and shut-off means shut off the filling orifice and, on the other hand, when the outer sleeve is moved to increase the volume of the pumping chamber, the telescopic assembly adopts its filling configuration and the shut off means cease to shut off the filling orifice.

Advantageously, the said means of shutting off the filling orifice consist of the radially innermost sleeve. As an alternative, they could comprise a valve element.

In a preferred embodiment, the telescopic assembly has just two sleeves, which means that the pump is relatively simple to manufacture.

Still in a preferred embodiment, the inner sleeve has a delivery passage opening, on the one hand, at one end, via a radial orifice situated facing the filling orifice when the inner sleeve is in a filling position and opening, on the other hand, at another end via an axial orifice, the outer sleeve being capable of shutting off the axial orifice when the outer sleeve is moved in such a way as to reduce the volume of the pumping chamber.

Still in a preferred embodiment, the outer sleeve comprises a top wall capable of shutting off the aforementioned axial orifice.

Still in a preferred embodiment, the inner sleeve can move between the top wall of the outer sleeve and a limit stop provided towards the bottom of the outer sleeve.

Still in a preferred embodiment, the friction between the inner sleeve and the base part is greater than the friction between the outer sleeve and the inner sleeve.

In one alternative form, the telescopic assembly comprises three sleeves.

In this alternative form, the radially innermost sleeve advantageously comprises, on its interior surface, a part capable of shutting off the filling orifice when this sleeve is in a shutting-off position, and a recess capable of allowing the flow of product from the filling orifice when this sleeve is in a filling position.

Still in this alternative form, the intermediate sleeve between the radially innermost sleeve and the outer sleeve

can move between a dispensing position in which it rests against a top wall of the outer sleeve, and a filling position in which it rests against a limit stop provided towards the bottom of the outer sleeve.

Still in this alternative form, the friction between the outer sleeve and the intermediate sleeve is less than the friction between the intermediate sleeve and the radially innermost sleeve, and the friction of the radially innermost sleeve on the base part is greater than the friction between the various sleeves of the telescopic assembly.

Advantageously, the base part comprises a hollow shaft equipped with at least one lateral opening defining the filling orifice.

A further subject of the invention is a container equipped with a pump like the aforementioned one.

The invention will be better understood from reading the detailed description which will follow of some non-limiting exemplary embodiments, and from examining the appended drawing in which:

- FIG. **1** is a diagrammatic view in axial section of a pump according to a first exemplary embodiment of the invention,
- FIGS. **2** to **4** are views similar to FIG. **1**, illustrating the operation of the pump of FIG. **1**,
- FIG. **5** is a diagrammatic view in axial section of a pump according to an alternative form of the invention, and
- FIGS. **6** to **12** are views similar to FIG. **5**, illustrating the operation of the pump of FIG. **5**.

The pump **10** depicted in FIGS. **1** to **4** is intended to be mounted on the neck **11**, of axis X, of a container **12** and comprises a base part **13** provided, towards its bottom, with a mounting skirt **14** shaped to snap-fasten over an annular bulge **15** of the neck **11**, a sealing skirt **16** shaped to fit, with sealing, inside the neck **11**, and a nozzle **23** for mounting a dip tube **24**.

At its upper part, the base part **13** has a hollow shaft **18**, comprising a side wall **19**, which is cylindrical of axis X, closed at its upper end by a top wall **20**.

Passing through the side wall **19**, in its upper part, is a filling orifice **21** through which the product from the container can flow, as will be specified hereinafter.

The pump **10** also comprises a telescopic assembly **30** made up of an outer sleeve **31** and an inner sleeve **32**, which can slide one with respect to the other, the inner sleeve **32** also being able to slide on the side wall **19** of the hollow shaft **18**.

The outer sleeve **31** acts as a push-button and comprises a tubular wall **35** of axis X, closed at its upper end by a top wall **36** perpendicular to the axis X.

A limit stop **37** projecting radially towards the inside is provided near the lower end of the tubular wall **35**, to cause the inner sleeve **32** to move upwards.

A radial hole **38** forming a dispensing passage passes through the tubular wall **35** near the top wall **36**.

The inner sleeve **32** is open at both axial ends and is able to move inside the outer sleeve **31** between a position in which it rests via its lower end **41** against the aforementioned limit stop **37** and a position in which it rests via its upper edge face **42** against the lower face **43** of the top wall **36**.

The inner sleeve **32** comprises an interior passage **45**, made in its thickness, opening at one end via an axial orifice **46** on to its upper edge face **42** and, at the other end, via its radial orifice **47** on to its radially interior surface **48**.

The inner sleeve **32** also comprises a radial hole **53**, forming a dispensing passage.

This hole **53** can come to face the hole **38** in the outer sleeve **31** when the inner sleeve **32** is resting via its upper

end **42** against the interior face **43** of the top wall **36** of the outer sleeve **31**, as depicted in FIG. **2**.

A helical coil spring **50**, working in compression, is placed inside the inner sleeve **32**, rests at its lower end on the top wall **20** of the hollow shaft **18**, and at its upper end on the lower face **43** of the top wall **36** of the outer sleeve **31**.

As an alternative, the spring **50** could be placed between the outer sleeve **31** and the base part **31**, around the hollow shaft **18**.

The friction between the inner sleeve **32** and the hollow shaft **18** is greater than the friction there is between the inner sleeve **32** and the outer sleeve **31**.

When the inner sleeve **32** rests against the limit stop **37** of the outer sleeve **31**, as depicted in FIG. **1**, the holes **38** and **53** are offset and do not communicate, and the upper part **55** of the inner sleeve **32**, which part is located above the hole **53**, shuts off the hole **38**.

When the pump **10** is in its configuration of rest, depicted in FIG. **1**, the lower part **56** of the inner sleeve **32**, which part is located below the orifice **47**, shuts off the filling orifice **21**.

With the hollow shaft **18**, the telescopic assembly **30** defines a variable-volume pumping chamber **60**.

More specifically, this pumping chamber **60** is delimited at the top by the top wall **36**, at the bottom by the top wall **20**, and laterally by the inner sleeve **32** and that part of the outer sleeve **31** which is located above the inner sleeve **32**.

The way in which the pump **10** operates is as follows.

To dispense some product, the user presses on the top wall **36** of the outer sleeve **31** to move the latter downwards, as illustrated in FIG. **2**.

The inner sleeve **32** remains motionless first of all, because the forces of friction between the inner sleeve **32** and the hollow shaft **18** are greater than those which there are between the outer sleeve **31** and the inner sleeve **32**.

The relative movement of the outer sleeve **31** with respect to the inner sleeve **32** continues until the inner sleeve **32** comes to bear, via its upper edge face **42**, against the lower face **43** of the top wall **36**.

The axial orifice **46** is then shut off by the top wall **36** whereas the holes **38** and **53** are practically aligned with one another and form an outlet passage, allowing the product contained in the pumping chamber **60** to be dispensed, as illustrated in FIG. **3**.

The inner sleeve **32** is then made to move downwards together with the outer sleeve **31**, against the return action of the spring **50**, to dispense the product contained in the pumping chamber **60**.

When the user releases the outer sleeve **31**, the latter begins by moving relative to the inner sleeve **32**, the latter remaining motionless given its friction against the hollow shaft **18**, until such time as the limit stop **37** comes up against the lower end **41** of the inner sleeve **32**, as depicted in FIG. **4**.

The axial orifice **46** is uncovered and air can be taken in while the holes **53** and **38** are in communication.

Thereafter, the holes **53** and **38** find themselves completely offset and no longer communicate.

As the outer sleeve **31** continues its return upwards movement under the return action of the spring **50**, and carries the inner sleeve **32** along with it because of the limit stop **37**, the volume of the pumping chamber **60** increases and the product is drawn in via the interior passage **45**, the radial orifice **47** being open facing the filling orifice **21**.

The product from the container flows through the interior passage **45** as long as the radial orifice **47** of the inner sleeve **32** is in communication with the filling orifice **21**.

The height of the filling orifice **21** is chosen such that the filling orifice **21** and the radial orifice **47** communicate when the outer sleeve **31** is fully depressed and as it moves back up, until such time as it is about to reach its up position.

A limit stop, which has not been depicted in order to make the drawing clearer, limits the upwards travel of the inner sleeve **32** with respect to the hollow shaft **18**.

The inner sleeve **32** and the outer sleeve **31** are kept in predetermined angular positions about the axis X by rotation-indexing means which have not been depicted in order to make the drawing clearer.

FIGS. **5** to **12** depict a pump **110** comprising a base part **113** which comprises a hollow shaft **119** of axis X.

The hollow shaft **119** comprises a side wall **161** through which a filling orifice **156** passes, and a top wall **162**.

The pump **110** also comprises a telescopic assembly **130**, which comprises an outer sleeve **131**, an intermediate sleeve **132**, and an inner sleeve **133**.

The outer sleeve **131** is closed at its upper end by a top wall **136** and near its lower end comprises a limit stop **137** directed radially inwards.

The intermediate sleeve **132** is open at both axial ends and can move axially inside the outer sleeve **131** between a position in which it rests via its upper end **138** against the lower face **139** of the top wall **136**, and a position in which it rests via its lower end **140** on the limit stop **137**.

The outer sleeve **131** comprises a hole **141**, forming a dispensing passage, and the intermediate sleeve **132** comprises a hole **142** forming a dispensing passage, which can be positioned facing the hole **141** when the intermediate sleeve **132** is resting against the top wall **136**, as illustrated in FIG. **2**, so as to form an outlet passage via which the product contained in the pumping chamber **160** is dispensed.

The intermediate sleeve **132** comprises, near its lower end, an inwardly-facing limit stop **150** against which the lower end **151** of the inner sleeve **133** can come to rest.

When the intermediate sleeve **132** is resting against the limit stop **137**, the holes **141**,**142** are not in communication, the hole **141** being shut off by the upper part of the intermediate sleeve **132**, which part is located above the hole **142**.

The inner sleeve **133** is open at both axial ends and comprises a lower part **155** capable of shutting off the filling orifice **156** of the hollow shaft **119** and an upper part which has a recess **158**.

The upper part of the inner sleeve **133** has perforations **180**, the function of which will be specified later on.

A return spring **170** is located inside the pumping chamber **160**, resting at its upper end against the top wall **136** and at its lower end against the top wall **162** of the hollow shaft **119**.

The friction of the inner sleeve **133** on the hollow shaft **119** is greater than the friction of the intermediate sleeve **132** on the inner sleeve **133**, which is itself greater than the friction of the outer sleeve **131** on the intermediate sleeve **132**.

The way in which the pump **110** works is as follows.

Initially, the holes **141** and **142** are offset and the pumping chamber **170** is isolated from the outside, as can be seen in FIG. **5**.

The lower part **155** of the inner sleeve **133** shuts off the filling orifice **156**.

When the user presses on the outer sleeve **131**, the latter begins to move relative to the intermediate sleeve **132** and the holes **141** and **142** communicate, as depicted in FIG. **6**.

The inner sleeve **133** and intermediate sleeve **132** have remained motionless.

As the user continues to press on the outer sleeve **131**, the volume of the pumping chamber **160** decreases and the

product is dispensed through the outlet passage formed by the holes **141** and **142**, as illustrated in FIG. **7**.

The intermediate sleeve is then resting via its upper end **138** on the top wall **136**.

Once the outer sleeve **131** has completed a certain amount of downwards travel, the inner sleeve **133** comes to rest on the top wall **136**, as illustrated in FIG. **8**.

The perforations **180** make it possible to prevent the inner sleeve **133** from impeding the dispensing of product through the holes **141** and **142**.

Next, as the user continues to press on the outer sleeve **131**, the inner sleeve **133** is moved relative to the hollow shaft **119** and the recess **158** positions itself facing the filling orifice **156**, as illustrated in FIG. **9**.

Air may be taken in through the holes **141**, **142**, the recess **158** and the filling orifice **156**.

When the user releases the outer sleeve **131**, the latter moves relative to the intermediate sleeve **132** under the return action of the return spring **170** until the limit stop **137** comes to rest against the lower end **140** thereof, as illustrated in FIG. **10**.

In this configuration of the telescopic assembly **130**, the holes **141** and **142** are no longer in communication.

The outer sleeve **131** and intermediate sleeve **132** then move back upwards again together, which causes the product contained in the hollow shaft **119** to be drawn into the pumping chamber, this product flowing through the filling orifice **156** and along the recess **158**, as illustrated in FIG. **11**.

The return upwards movement of the outer sleeve **131** and intermediate sleeve **132** continues until the inner sleeve **133** comes to rest against the limit stop **150** of the intermediate sleeve **132**, as depicted in FIG. **12**.

The inner sleeve **133** is then made to move upwards, its lower part **155** shutting off the filling orifice **156**.

This constitutes a return to the configuration of FIG. **5**.

Of course, the invention is not restricted to the exemplary embodiment which has just been described.

In particular, the shape of the telescopic assembly and that of the base part can be altered according to the nature of the product and the amount to be dispensed.

Furthermore, the return spring can be mounted not in the pumping chamber but between the outer sleeve and the base part.

What is claimed is:

1. A pump to be fitted to a container, the pump comprising a base part secured to the container, and a telescopic assembly which moves axially with respect to the base part and which defines therewith a variable-volume pumping chamber, the telescopic assembly comprising at least one outer sleeve and an inner sleeve sliding in contact with and inside the at least one outer sleeve, the inner and outer sleeves each comprising a dispensing passage, the dispensing passages communicating with each other when the telescopic assembly is in a dispensing configuration to then define an outlet passage allowing product contained in the pumping chamber to be dispensed, the dispensing passages ceasing to communicate with each other when the telescopic assembly is in a filling configuration, the base part comprising a filling orifice through which the product contained in the container can be drawn up to fill the pumping chamber, the telescopic assembly being arranged such that, when the outer sleeve is moved to reduce the volume of the pumping chamber, the telescopic assembly adopts the dispensing configuration and shutoff means shuts off the filling orifice and, when the outer sleeve is moved to increase the volume of the pumping chamber, the telescopic assembly adopts its filling configuration and the shut-off means ceases to shut off the filling orifice.

2. The pump according to claim **1**, wherein said shut-off means comprises a radially innermost sleeve.

3. The pump according to claim **1**, wherein the telescopic assembly has just two sleeves.

4. The pump according to claim **1**, wherein the telescopic assembly comprises a radially innermost sleeve, an outer sleeve, and an intermediate sleeve between the radially innermost sleeve and the outer sleeve.

5. The pump according to claim **1**, wherein the base part comprises a hollow shaft equipped with at least one lateral opening defining the filling orifice.

6. A container equipped with a pump as defined in claim **1**.

7. The pump according to claim **2**, wherein the friction between the inner sleeve and the base part is greater than the friction between the outer sleeve and the inner sleeve.

8. The pump according to claim **3**, wherein the inner sleeve has a delivery passage opening, at one end, via a radial orifice situated facing the filling orifice when the inner sleeve is in a filling position and opening at another end via an axial orifice, the outer sleeve being capable of shutting off the axial orifice when the outer sleeve is moved to reduce the volume of the pumping chamber.

9. The pump according to claim **8**, wherein the outer sleeve comprises a top wall capable of shutting off the axial orifice.

10. The pump according to claim **9**, wherein the inner sleeve can move between the top wall and a limit stop provided towards the bottom of the outer sleeve.

11. The pump according to claim **4**, wherein the radially innermost sleeve comprises, on its interior surface, a part capable of shutting off the filling orifice when the radially innermost sleeve is in a shutting-off position, and a recess capable of allowing the flow of product from the filling orifice when the radially innermost sleeve is in a filling position.

12. The pump according to claim **11**, wherein the intermediate sleeve between the radially innermost sleeve and the outer sleeve can move between a dispensing position in which the intermediate sleeve rests against a top wall of the outer sleeve, and a filling position in which the intermediate sleeve rests against a limit stop provided towards the bottom of the outer sleeve.

13. The pump according to claim **12**, wherein friction between the outer sleeve and the intermediate sleeve is less than friction between intermediate sleeve and the radially innermost sleeve.

14. The pump according to claim **13**, wherein friction of the radially innermost sleeve on the base part is greater than friction between the sleeves of the telescopic assembly.

15. A pump to be fitted to a container, the pump comprising a base part secured to the container, and a telescopic assembly which moves axially with respect to the base part and which defines therewith a variable-volume pumping chamber, the telescopic assembly comprising one outer sleeve and an inner sleeve in sliding contact with the outer sleeve, the inner and outer sleeves each comprising a dispensing passage, the dispensing passages communicating with each other when the telescopic assembly is in a dispensing configuration to then define an outlet passage allowing product contained in the pumping chamber to be dispensed, the dispensing passages ceasing to communicate with each other when the telescopic assembly is in a filling configuration, the base part comprising a filling orifice through which product contained in the container can be drawn up to fill the pumping chamber, the telescopic assembly being arranged such that when the outer sleeve is moved

to reduce the volume of the pumping chamber, the telescopic assembly adopts the dispensing configuration and the outer and inner sleeves shut off the filling orifice, and when the outer sleeve is moved to increase the volume of the pumping chamber, the telescopic assembly adopts the filling configuration and the outer and inner sleeves no longer shut off the filling orifice.

16. A pump to be fitted to a container, the pump comprising a base part secured to the container, and a telescopic assembly which moves axially with respect to the base part and which defines therewith a variable-volume pumping chamber, the telescopic assembly comprising one outer sleeve, an intermediate sleeve in sliding contact with the outer sleeve and an inner sleeve in sliding contact with said intermediate sleeve, the outer and intermediate sleeves each comprising a dispensing passage, the dispensing passages communicating with each other when the telescopic assembly is in a dispensing configuration to then define an outlet passage allowing the product contained in the pumping chamber to be dispensed, the dispensing passages ceasing to communicate with each other when the telescopic assembly is in a filling configuration, the base part comprising a filling orifice through which the product contained in the container can be drawn up to fill the pumping chamber, the telescopic assembly being arranged such that, when the outer sleeve is moved to reduce the volume of the pumping chamber, the telescopic assembly adopts the dispensing configuration and the inner sleeve shuts off the filling orifice and, when the outer sleeve is moved to increase the volume of the pumping chamber, the telescopic assembly adopts the filling configuration and the inner sleeve no longer shuts off the filling orifice.

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